

EVALUATION OF RELATIVE PERFORMANCES OF ORGANIC RICE CULTIVATION BASED ON EXPERIMENTAL EVIDENCE

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Introduction

Sri Lanka recorded a tremendous growth in rice productivity during last decades mainly due to high yielding varieties introduced with the green revolution. At present these varieties cover over 95% of rice lands leading to increase of national average rice yield to around 4.0 t/ha (RRDI, 2008). However, the issues associated with modern rice farming such as poor grain quality, high cost of production and health concerns have led to consider a better sustainable option *i.e.* organic farming with traditional varieties.

Today, there is a growing interest among the general public towards organically grown rice, and a number of NGO's are involved in contract organic rice cultivation in Sri Lanka. The existing literature also suggests that there are number of benefits associated with organic rice cultivation such as reduced cost of production and marketing risk. Meantime, the practitioners claim that organic rice cultivation is economically better than modern rice farming. Though there are a substantial number of studies involving comparison of these two practices, (*e.g.* Heimstraw and Haverkort, 1992; and Mendoza, 2002) none of these studies has dealt with economic analysis based on experimental data. Against this

background, a study was undertaken to compare the performances of organic and modern rice farming using traditional as well as improved varieties.

Materials and Methods

The field experiment was conducted at the Rice Research and Development Institute, Batalagoda during 2008/09 *Maha* season. The treatments consisted of two factors, varieties and fertilizer mixtures. Each factor had two levels, *i.e.*, varieties, *Sudu Heenati* and BG 360, and recommended inorganic fertilizer mixture for (IMZ) and organic matter (*Gliricidia* 10 t/ha, rice straw 4 t/ha, Eppawala Rock Phosphate 350 kg/ha *etc.*). The field operations were coordinated similarly for both the organic and conventional plots except for fertilizer and insecticide applications. Growth parameters at 50% flowering stage, final yield components and all the costs of inputs were recorded. The experimented evidences were supplemented by two case studies conducted with contract organic rice growers in Kurunegala district. The conventional statistical procedures together with cost-benefit analysis were employed.

Results and Discussion

The analysis of agronomic data revealed that, in general improved varieties outperform traditional varieties with respect to plant height, root length, number of tillers, stem weight and leaf weight at $P=0.05$ irrespective of the type of fertilizer which is exhibited by high harvest index by the improved variety. However, green leaf numbers, Leaf Area Indices (LAI's) and root weights were statistically not different (Table 1).

Both traditional and improved varieties had better performances with inorganic fertilizer compared to that with organic practices. The highest yield was recorded by conventionally grown improved variety which was 6.93 t/ha whereas the lowest yield was given by organically grown improved variety which was 3.39 t/ha. Conventionally grown traditional variety recorded a higher yield than organically grown traditional variety (5.30 t/ha vs. 4.45 t/ha).

The breakdown of the total cost of cultivation revealed that the highest cost component was the labour, irrespective of the variety or fertilizer applied. The organic practices were more labour intensive than modern practices due to organic inputs, transportation costs, and use of buffaloes in land preparation. The analysis further revealed that conventionally grown improved variety outperforms all with respect to the yield, revenue and the profit thus rejecting the claims of organic rice promoters. Analysis of benefit-cost ratios and break-even prices corroborate the same. Organically grown improved varieties did not perform well due to inadequate supply of nutrients as these improved varieties are unable to grow well under organic fertilizers which release nutrients slowly. This implies that improved varieties should not be recommended for organic farming.

Table 1. Varietal effect on plant growth

Growth parameter	BG 360	Sudu Heenati	P value
Plant height (cm)	81.95	117.40	0.0001**
Root length (cm)	20.65	17.10	0.0428**
No. of tillers	16.30	10.90	0.0103**
Green leaf no.	70.00	55.80	0.0809*
LAI	4.07	5.56	0.0598*
Root weight (g)	2.35	2.89	0.1185
Stem weight (g)	17.96	25.40	0.0246**
Leaf weight (g)	5.09	7.73	0.0074**

** significant at 5% * significant at 10%

Conventionally grown traditional varieties gave more or less its normal yield; however, it is difficult to obtain a premium price as there is no market prevailing for that. Though organically

grown traditional varieties gave a lesser yield than its conventional practices, it is still attractive as they can be sold at a premium price in the market under contract farming.

Conclusion and Implications

The findings of the study disprove the assertion that direct benefits of organic rice cultivation are better than the modern rice cultivation. However, as revealed by the case studies, under low-input conditions, it can perform economically well due to low production costs and premium price. Therefore, organically rice cultivation would be a viable option for rainfed subsistence farming in low potential areas with high labour availability. With the contract farming, organically grown traditional rice has access to the market, reduces the price risk though the relative yields are low. (The study has the limitation that the long-term performances could not be monitored.)

References

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